Estimate for the Work of Comprehensive Operation and Maintenance of 1.5 MLD TTP of Extended Aeration followed by Filtration and UV disinfection at Lal Baghfor the period of Three Years.

Scope of work: Comprehensive Operation and Maintenance of 1.5 MLD TTP of Extended Aeration followed by Filtration and UV disinfection at Lal Bagh including minor and major repairs to all the equipments inside the STP premises and in the treated water distribution line under the scope of BWSSB, supply of all spares required for the operation of the plant, supply of oil and lubricants, supply of supervisory and security staff, maintenance of gardens and trees and except power charges inclusive of all incidental items of work round the clock for a period of three years.

SL. No.	Item Description	Unit	Nos	Qty
	Cost of Manpower-The cost shall be Inclusive of cost required for the weekly off of the staff (i.e. round the clock and throughout per year the minimum staff shown in the tender shall be present excluding Plant Manager and Chemist in the 2nd and 3rd Shifts) inclusive of service tax, ESI,PF and other statutory costs of the all the deployed Staff including reliving staff and no extra cost is admissible.			
1	**Plant-Process Manager-**Process manager shall be a Graduate in Environmental Engineering with at least five years experience in the operation and maintenance of wastewater treatment plant or Postgraduate in Environmental Engineering with at least three years experience in the operation and maintenance of wastewater treatment plant	Man Month	1x12	
	1st Year		1x12	12.00
	2nd Year		1x12	12.00
	3rd year		1x12	12.00
2	**Analyst/Lab Analyst (chemist)-**The Analyst shall be Graduate in Science with Chemistry as major subject having at least Three years of Laboratory experience	Man Month	1x12	
	1st Year		1x12	12.00
	2nd Year		1x12	12.00
	3rd year		1x12	12.00
3	**Electrician/Operator-** 1 in 3 shifts (Electrician has to be deployed during weekly off and for this one extra man power has been considered) Electrician shall be ITI Certificate holders having at least 3 per years experience.	Man Month	3+1	
	1st Year		4x12	48.00
	2nd Year		4x12	48.00
	3rd year		4x12	48.00
4	**Helper-**1 in 3 shifts and 2 in General shifts or as per requirement for managing weekly off of shift helpers and for office and building maintenance, road cleaning, keeping plant premises neat and clean etc. (Sunday is weekly off) Helper shall be utilized for monitoring/ inspection/operation of valves in the treated water distribution lines	Man Month	3+2	
	1st Year		5x12	60.00
	2nd Year		5x12	60.00
	3rd year		5x12	60.00

SL. No.	Item Description	Unit	Nos	Qty
5	**Fitter** - 2 in General shifts or in shifts as per requirement (Fitter has to be deployed daily by managing weekly off) Fitter shall be ITI Certificate holders having at least 3 years experience.	Man Month	1x12	
	1st Year		1x12	12.00
	2nd Year		1x12	12.00
	3rd year		1x12	12.00
6	**Sludge Handlers-** 1 in General shifts	Man Month	1x12	
	1st Year		1x12	12.00
	2nd Year		1x12	12.00
	3rd year		1x12	12.00
7	**Security Staff-**1 in 3 shifts (Security staff has to be deployed during weekly off and for this one extra man power he been considered) for STP security and to maintain the register/books of treated water details	Man Month	3+1	
	1st Year		4x12	48.00
	2nd Year		4x12	48.00
	3rd year		4x12	48.00
8	**Laboratory chemicals for coducting inhouse Lab analysis-**all the chemicals for conducting routine such as pH, BOD, TSS, COD, Total Coliform, and Fecal coliform, including the reagents for conducting the tests using available spectrophotometer. Maintenance of the Laboratory is included. All necessary items required for the complete/routine testing as per procedure of the samples is included. The cost shall be inclusive of all the Items required for completion of the Item. a) Routine tests /Daily tests to be carried out for the raw sewage and effluent of the composite sample 1) pH 2) Total Suspended Solids 3) Turbidity 4) Total Residual Chlorine 5) Dissolved Oxygen 6) BODs 7) COD 8)Total Coliform Test 9) Fecal Coliform and including Daily Tests to be conducted mainly for the 7+ parameters tested/insisted by KSPCB as per latest prevailing norms required for legal compliance to KSPCB/CPCB. b) Tests to be conducted once in a month from the External Laboratory approved by MOEF/KSPCB/CPCB for raw and effluent of the composite sample for all the following parameters including the above parameters totaling to 32 parameters 1) Conductivity 2) Ammonical Nitrogen 3) Sulphates 4) Lead 5) Arsenic 6) Chromium 7) Nickel 8) Zinc 9) Chromium 10) Selenium 11) Boron 12) Cyanide 13) Chlorides 14) Fluorides 15) Copper 16) Cadmium 17) Mercury 18) Pesticides 19) Phenolic compounds 20) Sodium absorption ratio 21) Residual sodium carbonate 22) Bioassay Test 23) Total Phosphorous as P, mgl etc c) Requirement of Chemicals for conducting tests in the laboratory: For COD Test 1) Potassium dichromate 2) Ferrous Ammonium Sulphate 3) Concentrate Sulphuric acid 4) Silver sulphate 5) Mercury Sulphate 6) Ferroin indicator /For DO Test 1) Manganese sulphate Monohydrate 2) Sodium Hydroxide 3) Potassium iodide 4) Sodium azide 5) Conc. Sulphuric Acid 6) Sodium Thiosulphate Pents hydrate 7) Starch Soluble /For BOD Test: 1) Magnesium Sulphate heptahydrate 2) Ferric chloride 3) Phosphate Buffer 4) Pottasium Hydrogen Phosphate 5) DI Potassium Hydrogen Phosphate 6) Di sodium hydrogen phosphate 7) Ammonium Chloride /For Fecal and Coliform Test: 1) Thiopeptone or Thiotone 2) Casitone of Trypticase 3) Yeast extract 4) Lactose 5) Sodium Chloride 6) Di Potassium Hydeogen Phosphate 7) Potassium DI-Hydrogen Phosphate 8) Sodium Lauryl Sulphate 9) Sodium Desoxychloride 10) Sodium Sulphate 11) Basic Fuchigin 12) Alcohol 13) Conductivity solution 14) Free chlorine reagent 15) pH Buffer solution 4.oit 16) pH Buffer solution 10.0 lt Not limited to above and includes any other item left out to complete the job for legal compiance to KSPCB/CPCB.			
	1st Year	Job	1x12	12.00
	2nd Year	Job	1x12	12.00
	3rd year	Job	1x12	12.00

SL. No.	Item Description	Unit	Nos	Qty
9	**Maintenance of Laboratory consumables & Laboratory equipments-** A)Laboratory consumables: The glassware's required for the testing has to be supplied. Any breakages in the glassware shall be immediately replaced. The cost shall be inclusive of all the items required for completion of the Item. 1) Membrane Filter paper 2) Bulb pipette 25 ml 3) Test tube without rim (18x150mm) 4) Nessiar Tube 100m1 5) Wash Glass 100 ml 6) Reagent bottle amber 250 ml 7) Reagent bottle amber 500 ml 8) Apirator Bottle 5 litr 9) Apirator Bottle 10 ltr 10) Separating Funnel 250 ml 11) Separating Funnel 500 ml 12) Petri Plate 13) Beakers 100 ml 14) Beakers 250 m1 15) Beakers 500 ml 16) Beakers 1000 ml 17) Reagent Bottle 250 ml 18) Reagent Bottle 500 ml 19) Reagent Bottle 1000 ml 20) Burette-25 ml 21) Burette-50ml 22) BOD Bottle 300ml 23) Evaporating Dish 24) Measuring Jar 10 ml 25) Measuring Jar 25 ml 26) Measuring Jar 50 m1 27) Measuring Jar 100 ml 28) Measuring Jar 250 ml 29) Measuring Jar 500 ml 30) Measuring Jar 1000 ml 31) Glass rods 32) Conical Flask 150 ml 33) Conical Flask 250 ml 34) Conical Flask 500 ml 35) Plastic Measuring Jar 500 ml 36) COD Flat Bottom Flask 500 ml 37) Condenser for Reflux 38) Volumetric flask-50 ml 39) Volumetric flask-100 ml 40) Volumetric flask-250 ml 41) Volumetric flask-500 ml 42) Volumetric flask-1000 ml 43) Flat Bottom Boiling Flask 2000 44) Whatman Filer paper No41/12.5 cm box 45) Funnel 100 ml 46) Pipette 1 ml 47) Pipette 5 ml 48) Bulb Pipette 10 ml 49) 12' SS Tongues 50) Glass Beads 500 gms 51) Flat Bottom Flask without joint 52) 6" Nickle Spatula 53) Nickle Cruciable 54) Plastic Burette Stand 55) pH paper Booklet 1-10 pH Miscellaneous Items B) Maintenances (Repair/replace)of Laboratory equipments including supply of equipments to test the parameters to meet legal compliance to KSPCB/CPCB : 1) BOD Incubator 2) COD hot plate 3) Open reflux apparatus 4) pH meter 5) Thermometer 6) Physical Balance 7) Hot air oven 8) Chlorometer 9) Refrigerator 10) Spectrophotometer 11) BOD Track Instrument 12) Turbidity meter 13) Magnetic Stirrer with hot plate 14) Digital colony counter 15) Suction pump 16) Membrane filtration assembly 17) Bacteriological Incubator 18) Miscellaneous items. Not limited to above and includes any other item left out to complete the job for legal compiance to KSPCB/CPCB.			
	1st Year	LS	1x12	12.00
	2nd Year	LS	1x12	12.00
	3rd year	LS	1x12	12.00
10	**For office maintenance:** Establishment / Office Expenses / Stationery / Printing - The stationary required for furnishing the reports such as Paper, Cartridges, File folders, Registers, writing materials etc. are included. The printing of the Log books in the prescribed proforma has to be carried out. The print outs shall be attached to the monthly reports. The cost shall be inclusive of all the items required for completion of the item, etc. a) office Maintenance b) Internet charges c) Computer Maintenance-2 No's d) Printer maintenance-1 No e) Printing paper-A4 size f) Printing paper-A3 size g) Printing Cartridge replacements h) File Folders i) Printing of main log book j) Registers for each unit k) Writing materials l) Miscellaneous Items. Not limited to above and includes any other item left out to completer the job.			
	1st Year	LS	1x12	12.00
	2nd Year	LS	1x12	12.00
	3rd year	LS	1x12	12.00
11	**Transportation and Disposal of Grit and Sludge** -the grit / sludge generated in the Grit chamber / Centrifuge and sludge drying beds have to be collected and transported outside in the environmentally friendly manner. The waste generated in the treatment plant site shall also be disposed off. The cost shall be inclusive of all the Items required for completion of the Item. A) Wheel barrows b) Tractor/Lorry charges etc.			
	1st Year	LS	1x12	12.00
	2nd Year	LS	1x12	12.00
	3rd year	LS	1x12	12.00
12	**Maintenance consumables** for Lalbagh Plant: Oil and Grease - the Oil and grease, Distilled Water ,Welding Rods, Cotton waste CRC, Insulation Tapes, Teflon Tape , Gland, Gasket Miscellaneous etc required for the O&M of the plant shall be supplied. The quantities and replacement period shall be carried out as per the lubrication chart. The cost shall be Inclusive of all the items required for completion of the Item.			
	1st Year	LS	1x12	12.00
	2nd Year	LS	1x12	12.00
	3rd year	LS	1x12	12.00

SL. No.	Item Description	Unit	Nos	Qty
13	**Major and Minor Maintenance and Insurance of Plant and Equipment:** All the major and minor repairs of Civil, mechanical electrical and Instrumentation & automation equipments are to be carried out. The spares required for this and also any replacement required in all the mechanical, electrical equipments and Instrumentation & automation equipments are included in this item. Whatever the spares required for all major and minor repairs shall be provided even though they are not listed in detail.The cost shall be Inclusive of all the items required for completion of the item. a)Repairs/Replacement Includes All plant and equipments installed/comissioned/operated by BWSSB within the premises of TTP , Jackwell(TSPS) including Pump &macheneries related to GLR and in the existing treated water distribution line from TTP GLR. b) Electrical inspectrorate compliance charges and Annual Maintenance of DG Set : certification & calibration report from first class contractor [Includes Transformer oil Filtration,Testing of KWH Meters, CT's, Relay, Earthing & Painting of Transformer & Fencing by silver paint through Spray Gun For all Transformer) along with providing insulation mats , Fire extingusier refills and Fire Buckets and necessary items.Maintenance of DG Set with periodical checks, battery maintenance, AMF panel replacement of coolant, oil filter, diesel filter ,etc. complete along with necessary B-Check C.Check in compliance with electrical inspectorate c) Servicing and calibration of Instruments. d) Maintenance of Garden and landscaping, Street Lightings and Building Lightings. e) Emptying the Aeration Tank and removing of Settled slit and Servicing of Diffuser system and maintenance of the same, , Miscellaneous f)Safety items required for O&M for TTP i.e., All the required safety items shall be supplied such as First aid Kit, Uniforms, Safety items, Gumboots, Safety helmets, Masks, Hand gloves, goggles, Safety belt, Apron for chemical handlingWind scok, lifebuoys, fire extinguisner, sand buckets etc. g)The required Insurance for the Plant and Equipment shall be carried out. Miscellaneous items which are not included in the list, but not limited to shall be carried out for smooth operation of TTP with all legal compliance.			
	1st Year	LS-Qtr	1x4	4.00
	2nd Year	LS-Qtr	1x4	4.00
	3rd year	LS-Qtr	1x4	4.00
14	Diesel Charges for DG set			
	1st Year	Ltr	1.00	7500.00
	2nd Year	Ltr	1.00	7500.00
	3rd year	Ltr	1.00	7500.00
15	**Supply of Polymer** a) Supply of Polymer for Dewatering Sludge in Centrifuge: Supply and delivery of Polymer DK SET; P3 110 marketed by Mr. Dal-Ichl-karkaria limited, D13 M1DC, KurKumbh Tail, Daund District, Pune 413106 of equivalent approved make for Dewatering Sludge In Centrifuge to be supplied in 25 kg Polythene pack. Polymer required per day 0.5 kg/day, therefore required polymer per year = 0.5x365=182.50 kgs/Year for full capacity operation. b) Supply of Polymer for Flocculation in Flocculator chamber: Supply and delivery of Polymer DK SET ; P3 110 marketed by Mr. Dal-IChi-karkaria limited, D13 MIDC, KurKumbh Tail, Daund District, Pune 413106 of equivalent approved make for flocculation to be supplied in 25 kg Polythene pack. Polymer dosage 0.5 mg/ltr, therefore required polymer per day is 0.5x1.5=0.75 kgs/day, per year = 0.75x365=273.75 kgs/Year for full capacity operation.			
	1st Year	kg	1.00	500.00
	2nd Year	kg	1.00	500.00
	3rd year	kg	1.00	500.00

SL. No.	Item Description	Unit	Nos	Qty
16	**Supply of Sodium Hypo chlorite Solution** Supply of Sodium Hypochlorite Solution for Disinfection; Supply and delivery of Sodium Hypochlorite with 10% strength chlorine available in 40kg plastic cans recommended percent strength of solution to be prepared for dosing equals to 2 to 4%, Sodium Hypo chloride dose 3 mg/ltr: therefore required sodium hypo chloride per day 3x10x1.5=45 kg/day, per year =45x365=16425 kg/Year for full capacity operation.			
	1st Year	kg	1.00	17000.00
	2nd Year	kg	1.00	17000.00
	3rd year	kg	1.00	17000.00
17	**Supply of Alum for chemical coagulation in flash mixer:** Supply and delivery at Lalbagh treatment plant of filter Alum (Alumino ferric) Aluminum Sulphate (AI2SO4) 3.4S2O in plums of size maximum of 55mm per Alum bricks of commercial strength containing not less than 16% of AI2O3 and Fe less than 0.7% confirming to IS 299-1989 to be supplied, packed in sealed HDPE bags of 50 kgs quantity totally early requirement to be supplied In monthly requirement quantities. Every month for 12 month. Recommended % strength of solution to be prepared for dosing equals to 8 to 10 percent; Alum dosage 45 mg/lt ; Therefore required Alum = 45 x 1.5 = 67.50 kg/day: Therefore Alum required per Year = 67.50x 365=24,637.5 kg/Year for full capacity operation.			
	1st Year	kg	1.00	26000.00
	2nd Year	kg	1.00	26000.00
	3rd year	kg	1.00	26000.00
18	Painting all wall surface, including internal, external walls surfaces, handrails, shutter, doors, windows and ventilators, pipe lines structural member, motors, street lights etc.			
	1st Year	LS	1.00	1.00